

Exhibit

F

Supplemental Expert Disclosure – Carmen A. Taveras, Ph.D.

(January 31, 2024)

The Government hereby supplements its December 8, 2023 notice (the “Initial Taveras Notice”) regarding the anticipated testimony of Dr. Carmen Taveras. As previously disclosed, Dr. Taveras is an expert in economic and quantitative analysis of securities markets and trading and will testify about Archegos’s portfolio as well as the trends, effects and significance of Archegos’s trading on the markets for its various securities.

This supplemental notice adds further detail to the matters previously described in the Initial Taveras Notice, including by identifying relevant methodologies, reporting outputs, and providing draft graphs and demonstratives. Except where specifically noted, this supplemental notice does not intend to relinquish any subject or anticipated testimony previously described. This supplemental notice also does not recite Dr. Taveras’s qualifications, which are described in the initial notice and in her *curriculum vitae*, or set out again the terms and concepts that are likely to arise during her testimony. Finally, and at the Court’s suggestion, the Government is further providing notice in the form of intermediate tables, computer code, and model outputs related to the analysis.

The Government reserves the right to further supplement its notices regarding Dr. Taveras’s testimony.

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A. Background Topics

1. As described in the Initial Taveras Notice, Dr. Taveras's testimony may include background terms and concepts related to trading and markets in order to present her analysis and opinions. Dr. Taveras's understanding of these background concepts rests on her educational and professional experience, including the near decade that Dr. Taveras has spent at the U.S. Securities and Exchange Commission ("SEC").

2. As described in the Initial Taveras Notice, Dr. Taveras will explain how national exchanges, such as Nasdaq and NYSE, function, what trade and order information is captured by the marketplace, what information is broadcast to market participants, and how securities transactions occur within them. Dr. Taveras's understanding of these background concepts rests on her educational and professional experience, including the near decade that Dr. Taveras has spent at the SEC.

B. Summary Statistics and Graphical Representations¹

3. As described in the Initial Taveras Notice, Dr. Taveras will provide summary statistics and graphical representations reflecting the price and trade volume for equities traded under the ticker symbols VIAC, DISCA, DISCK, GSX,² IQ, TME, VIPS, BIDU, FTCH, and TCBI (the "Archegos Top Long Positions") and FUTU and RKT (the "Archegos Top Short Positions") (the "Archegos Top Long Positions" and the "Archegos Top Short Positions" are collectively the "Top Archegos Securities") during 2020 and 2021 and at various points and intervals within 2020 and 2021.

4. Dr. Taveras's summary statistics and charts regarding Archegos's portfolio rely on the following primary data sources:

- Archegos's trade blotters;³
- CRSP for prices and trading volume of the Top Archegos Securities;⁴
- Bloomberg for prices of market and industry ETFs.⁵

5. Dr. Taveras will show how the market prices of the Archegos Top Long Positions generally increased between 2020 and 2021, typically in excess of the relevant market and industry ETFs,

¹ The Government has provided to the defense the underlying files and programming code used to conduct all analyses and generate all graphical depictions in this disclosure as well as in the accompanying appendices. These can be found in Appendix A at A.1.

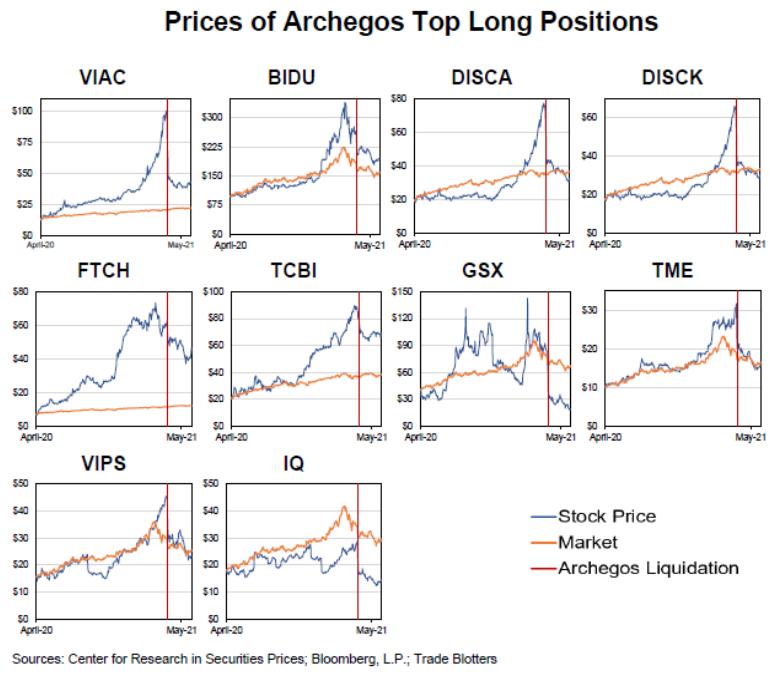
² "GSX" is now listed under the symbol "GOTU."

³ SDNY_P001_0006141102, originally entitled, SEC-DOJ-EPROD-000000001; SDNY_P002_0000065205, originally entitled, CITCO-SDNY-00002041; and SDNY_P002_0000023044, originally entitled Archegos-SDNY-04525665.

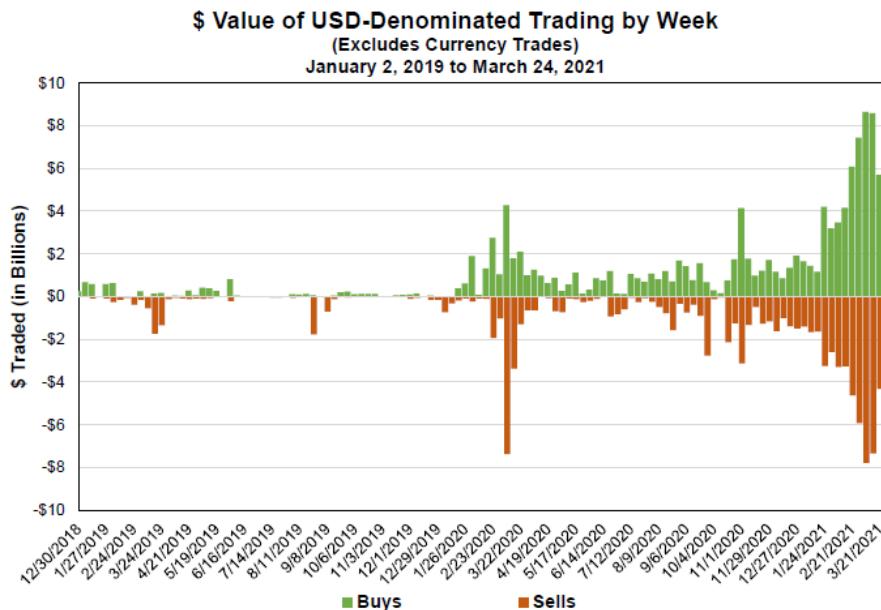
⁴ SDNY_P016_0000010802, originally entitled Crsp_tickers.csv.

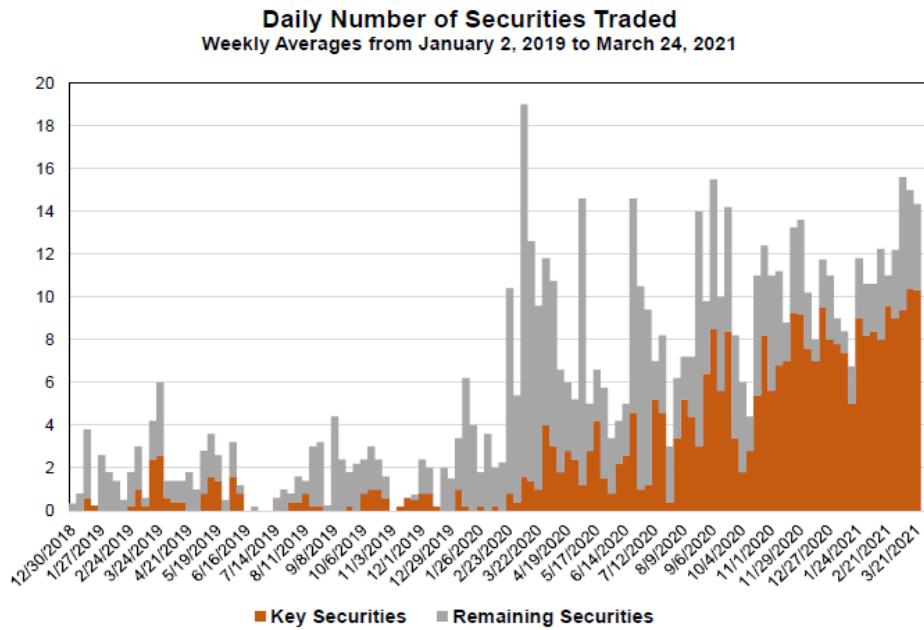
⁵ 3571-031; 3571-032; Appendix B at B.a.

and then decreased following the Archegos liquidation in March 2021. The graphs, below, plot the prices of the Archegos Top Long Positions between 2020 and 2021. (See Appendix B at B.1.)

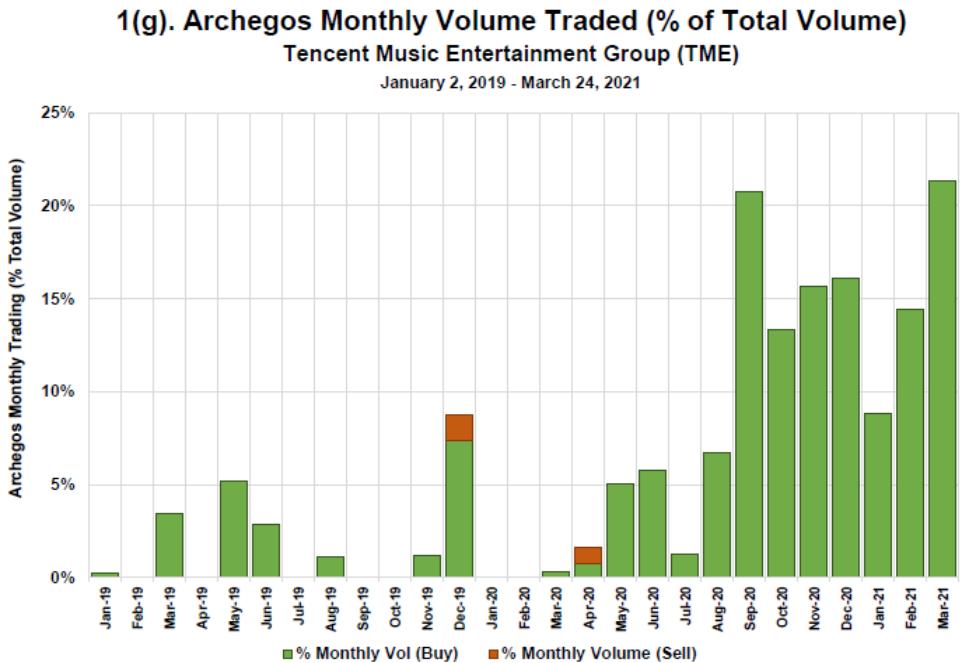


6. Dr. Taveras will show that Archegos increased its volume of buying and selling securities during 2020 and 2021, and that this increase in buying and selling corresponded to an increase in buying and selling of the Top Archegos Securities. The graphs, below, plot the increase in Archegos's trading over time, as well as the weekly average number of different securities traded by Archegos each day, including the portion of trades that were in the Top Archegos Securities. The term "Key Securities" refers to the Top Archegos Securities. (See Appendix B at B.2.)

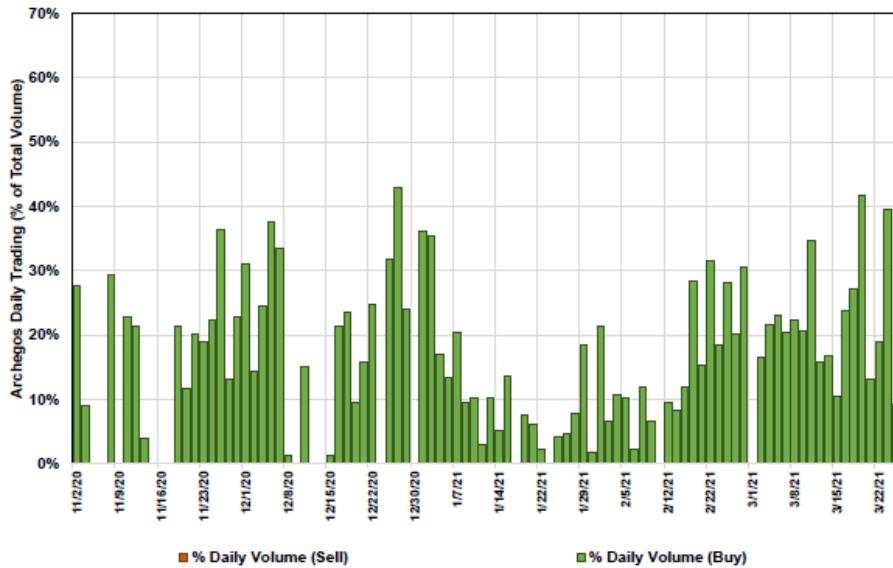




7. Dr. Taveras will show that Archegos routinely traded in excess of 15% of daily trade volume for the Top Archegos Securities beginning in late 2020 and continuing until March 2021. Figure 1(g), below, plots Archegos's monthly volume traded for TME. Figure 2(g), below, plots Archegos's daily volume traded for TME. The remainder of the Top Archegos Securities can be found in Appendix B at B.3.



2(g). Archesos Daily Volume Traded (% of Total Volume)
Tencent Music Entertainment Group (TME)
November 1, 2020 to March 24, 2021



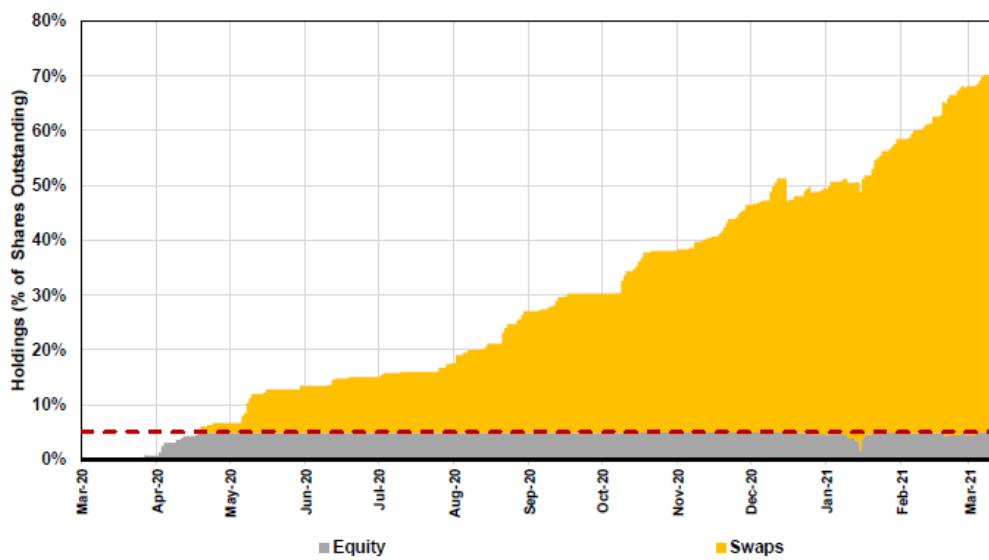
9. Dr. Taveras will explain that Archegos would establish its investments in the Top Archegos Securities in cash equities, until it approached 5% ownership of outstanding shares of a particular security, at which point Archegos would gain additional exposure (and market risk) to the security through swaps. Figure 5(j), below, shows Archegos's investment in GSX, where Archegos's exposure reached 70% of the shares outstanding of the issuer. Additional charts can be found in Appendix B at B.4. This analysis relies on weekly ownership test reports, in addition to the other sources noted above.

5(j). Archegos Daily Holdings (% of ADR-Equivalent Shares Outstanding)

GSX Techedu, Inc (GSX)

March 13, 2020 - March 24, 2021

Maximum Equity as % of ADR-Equivalent Shares Outstanding: 4.98%

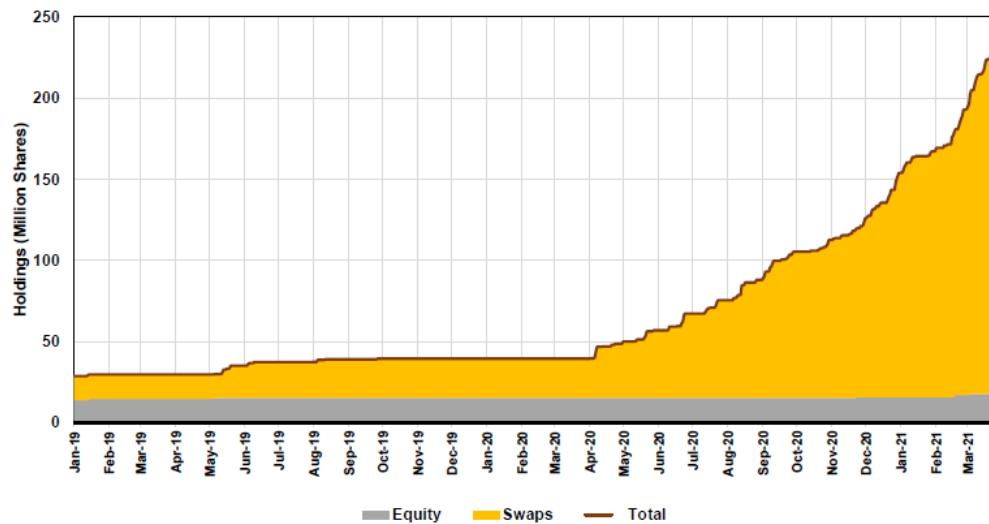


10. Dr. Taveras will explain that Archegos's positions in the Top Archegos Securities grew between 2020 and March 2021, both in number of shares held and in the value of Archegos's holdings. Figure 7(f), below, plots Archegos's growth in iQIYI in the number of shares. Figure 9(f), below, plots Archegos's growth in iQIYI in the value of Archegos's holdings. Additional charts can be found in Appendix B at B.4.

7(f). Archegos Daily Holdings (Shares)

IQIYI, Inc (IQ)

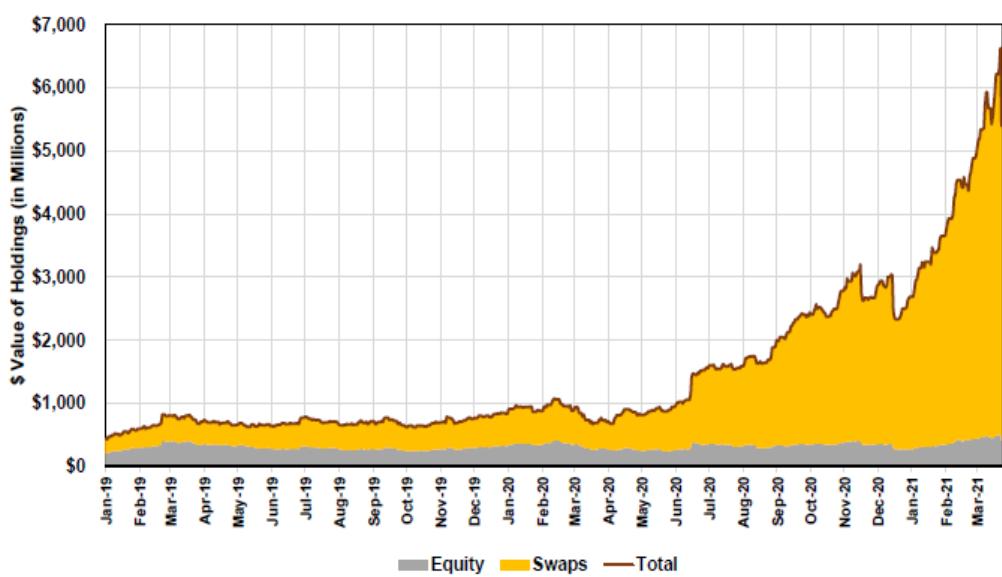
January 2, 2019 - March 24, 2021



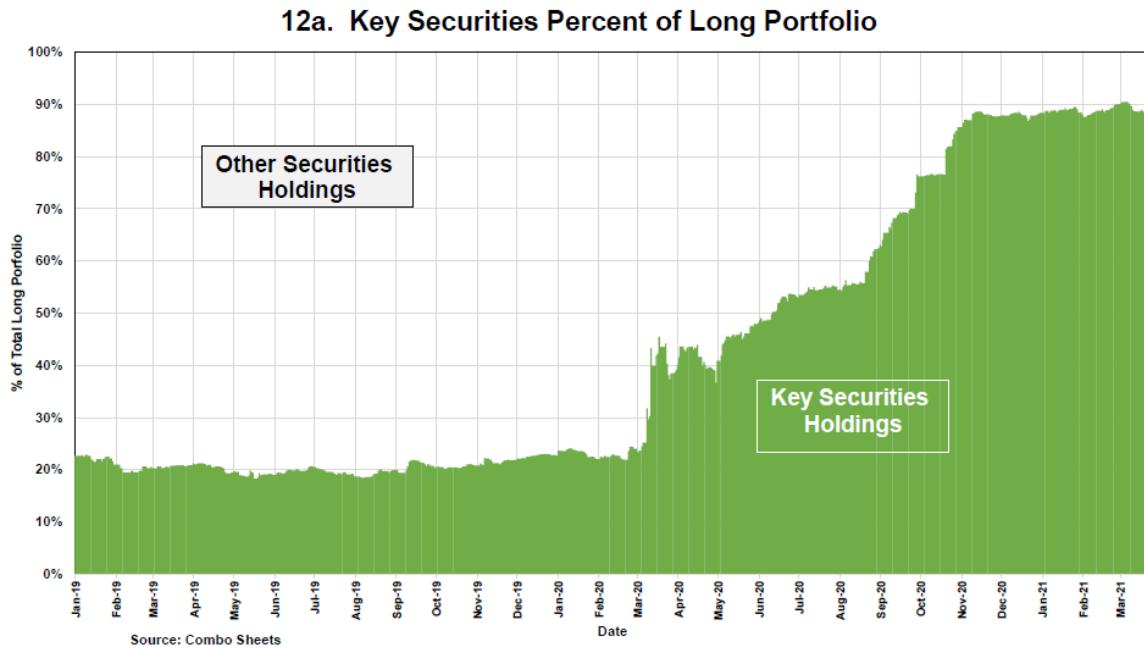
9(f). Archegos Daily Dollar Value of Holdings

IQIYI, Inc (IQ)

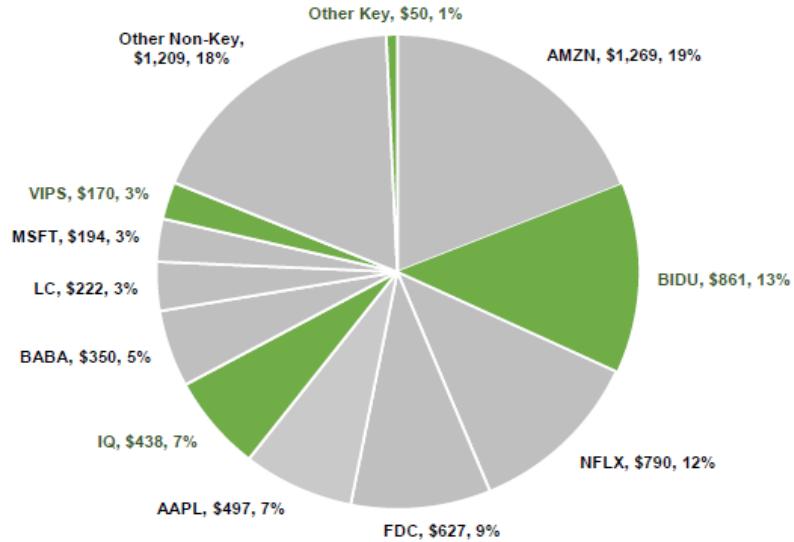
January 2, 2019 - March 24, 2021



11. Dr. Taveras will explain that the securities that comprised the largest percentage of Archegos's long holdings in or around January 2019 were replaced by the Archegos Top Long Positions by March 2021. Figures 12(a), 13(a) and 13(e), below, plot the change in composition of Archegos's portfolio over time. Additional charts can be found in Appendix B at B.5.

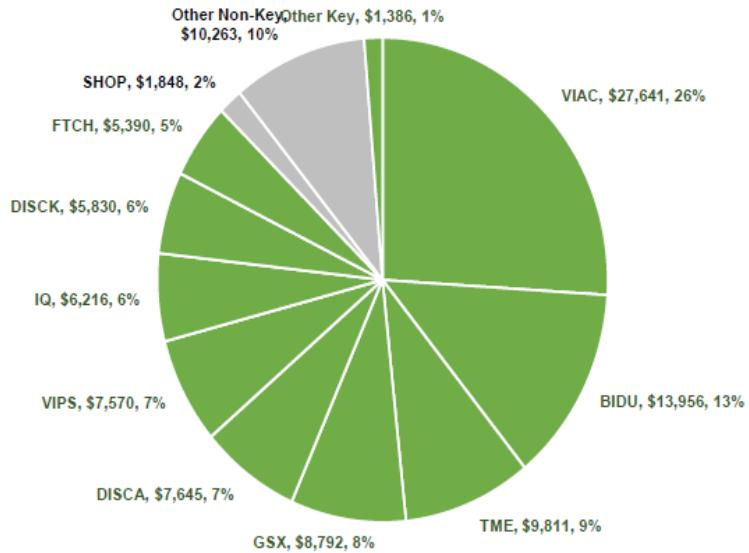


13a. January 2, 2019 Holdings (\$6.7B) (\$ Millions)



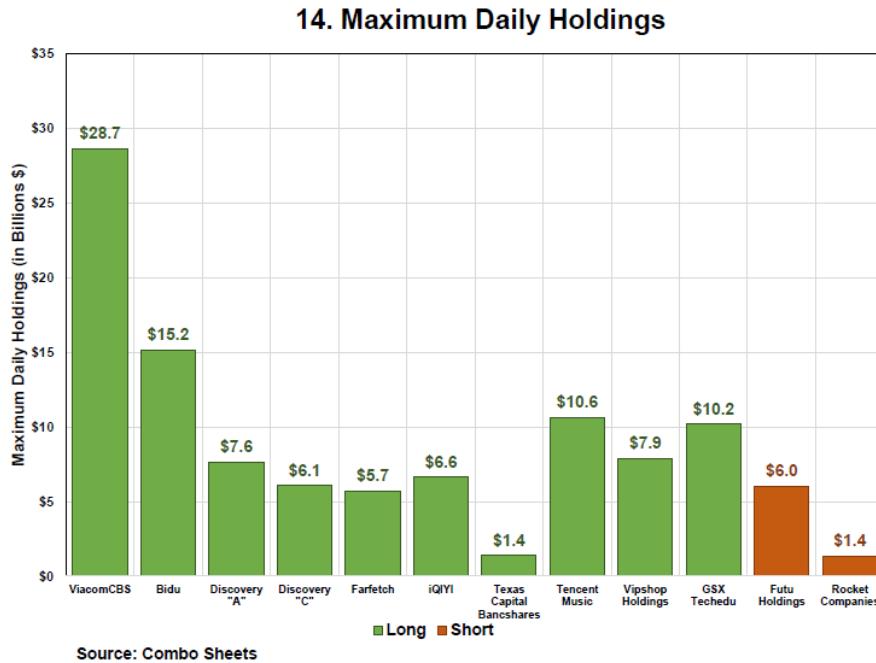
Source: Combo Sheets

13e. March 19, 2021 Holdings (\$106.3B) (\$ Millions)

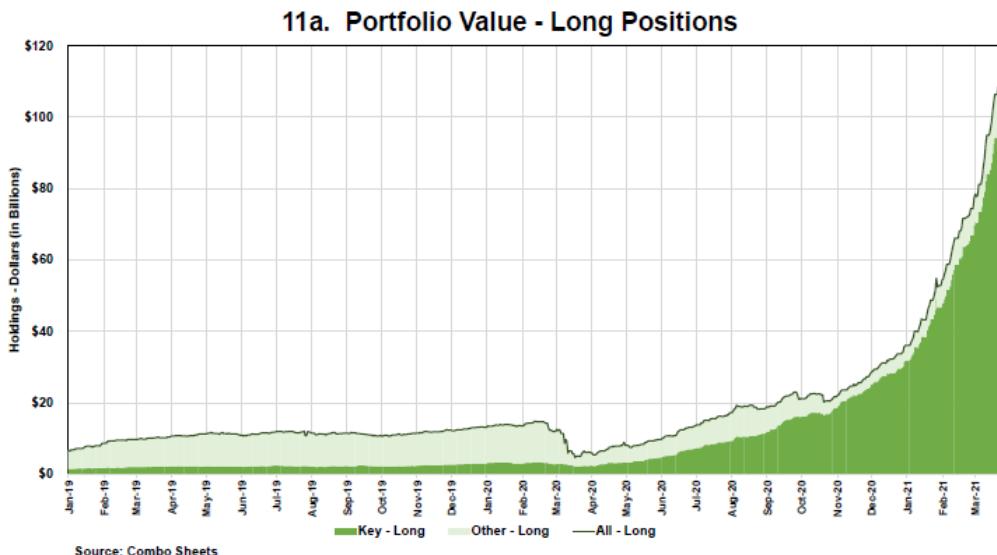


Source: Combo Sheets

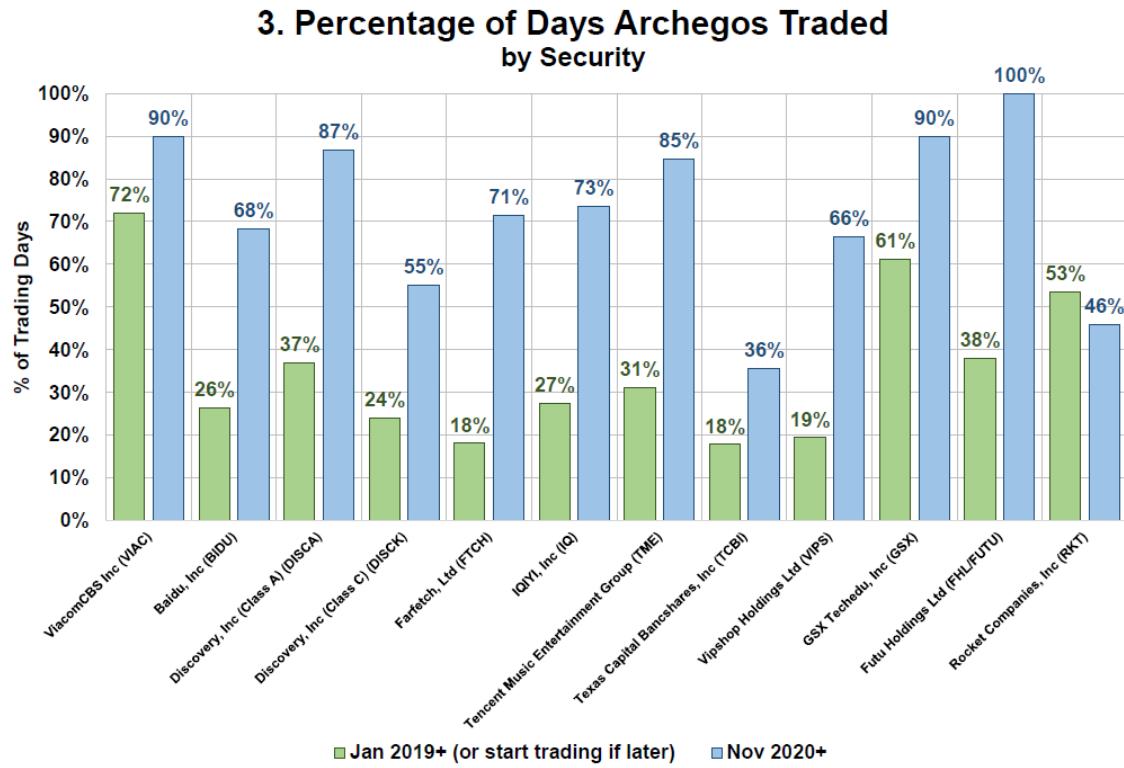
12. Dr. Taveras will explain that, with two exceptions, Archegos's maximum daily holdings in the Top Archegos Securities exceeded five billion dollars each. As reflected in Figure 14, below, for certain of the Top Archegos Securities, these amounts were triple or quintuple, equaling \$15.2 billion (for BIDU) and \$28.7 billion (for VIAC). (See Appendix B at B.5.)



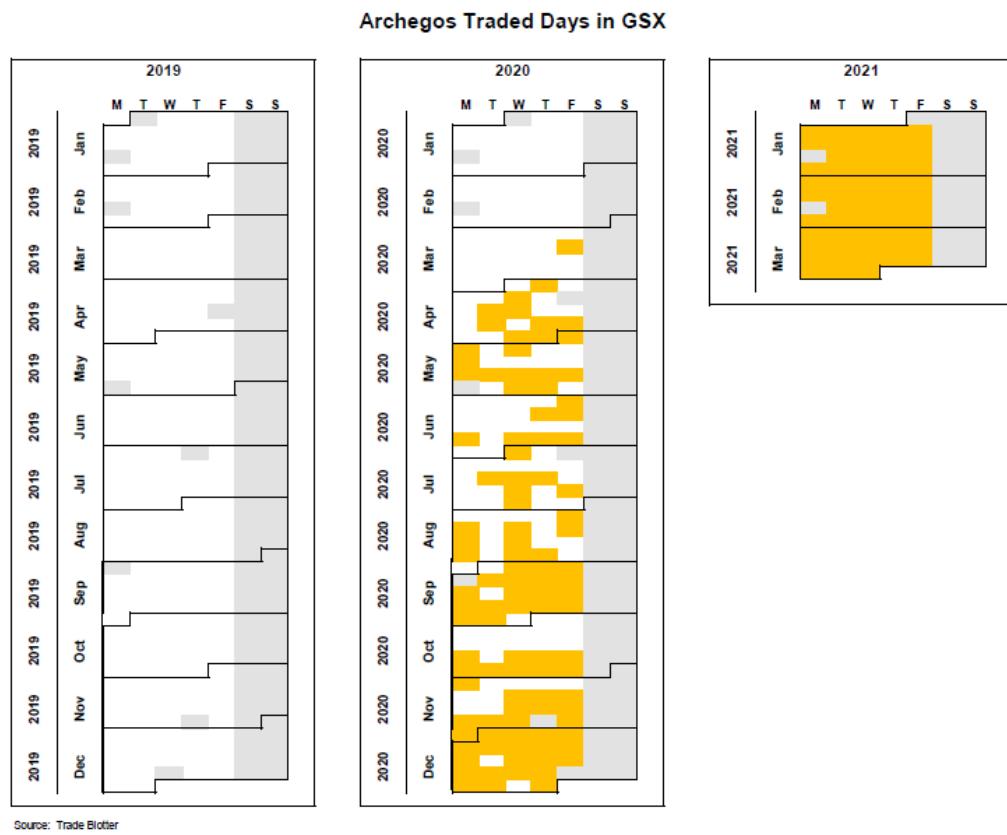
13. Dr. Taveras will explain that, by March 2021, the portfolio value of Archegos's long positions had grown to more than \$100 billion dollars, 90% of which was composed of the Archegos Top Long Positions. (See Appendix B at B.5.)



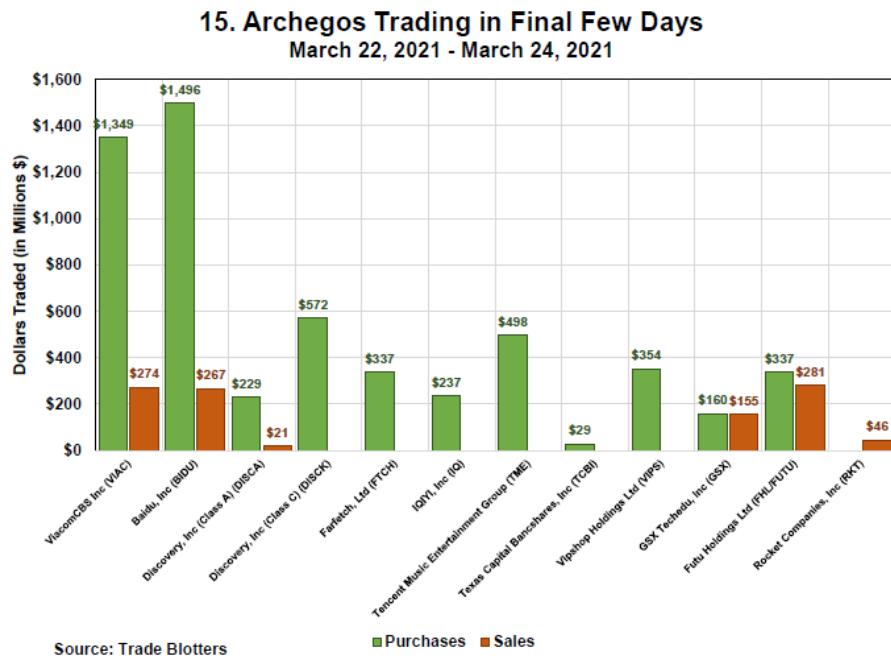
14. Dr. Taveras will calculate the percentage of total days that Archegos traded in the Top Archegos Securities, observing that Archegos generally increased the frequency with which it traded in the Top Archegos Securities after November 2020. Figure 3, below, reflects the percentage of days that Archegos traded in each of the Top Archegos Securities.



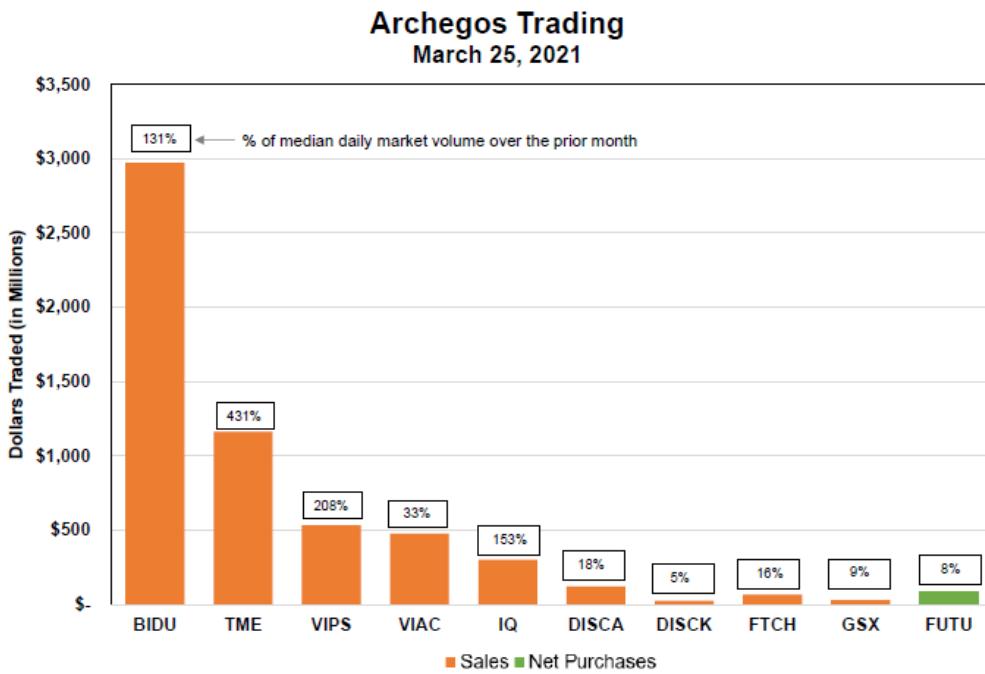
15. The chart below reflects, in yellow, each day that Archegos traded in GSX. Additional charts can be found in Appendix B at B.6.



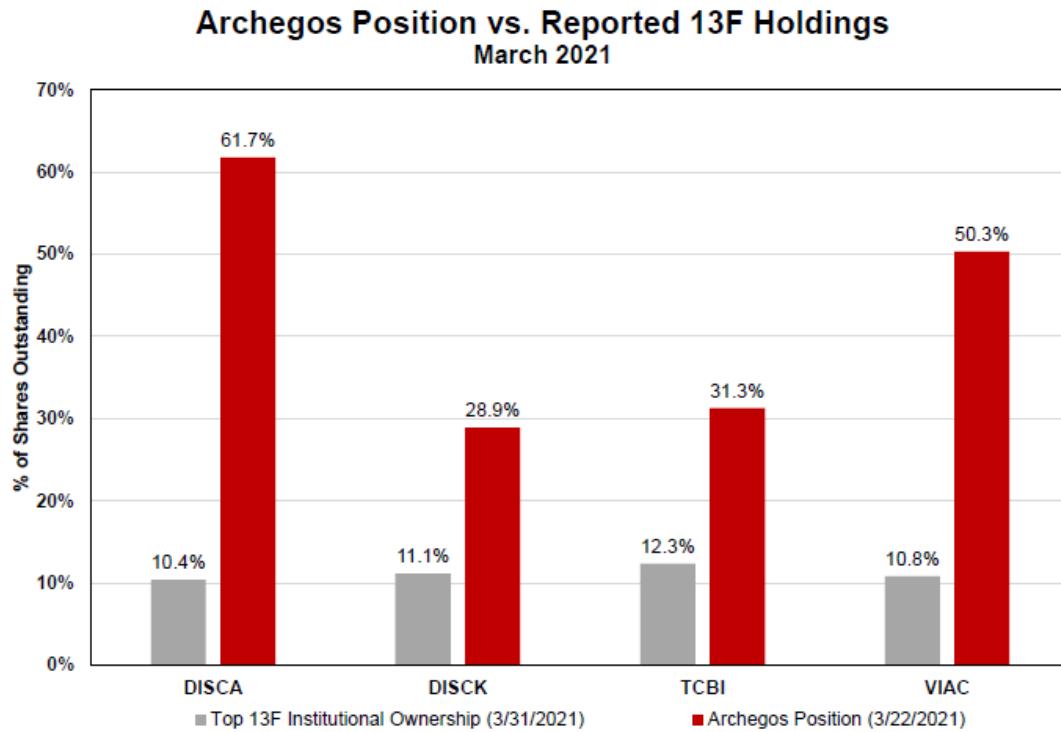
16. Dr. Taveras will calculate Archegos's purchases and sales of the Top Archegos Securities between March 22, 2021 and March 24, 2021. (See Appendix B at B.7.)



17. Dr. Taveras will calculate Archegos's trading volume on March 25, 2021, both in terms of total dollars traded and as a percentage of median daily market volume over the prior month. (See Appendix B at B.8.)

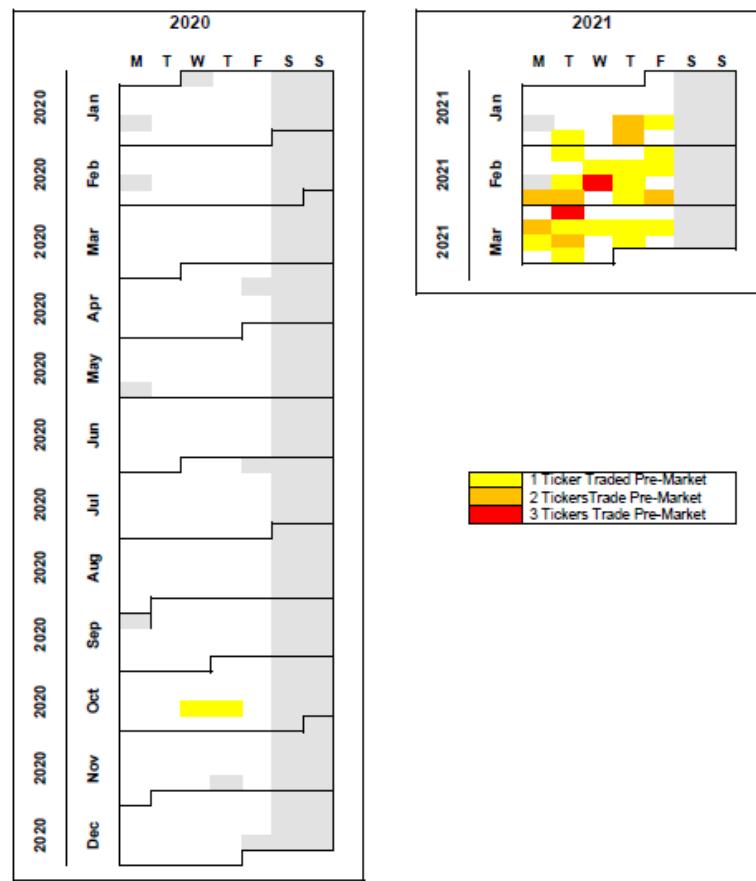


18. Dr. Taveras will compare Archegos's holdings in DISCA, DISCK, TCBI, and VIAC as of March 22, 2021, to the reported holdings of the largest institutional owners for those same securities pursuant to Rule 13F filings. As reflected below, Archegos's positions in these securities exceeded the reported holdings of the other largest institutional owner in the same securities. This analysis relies on weekly ownership test reports and 13F filing data, in addition to the other sources noted above. (See Appendix B at B.9.)

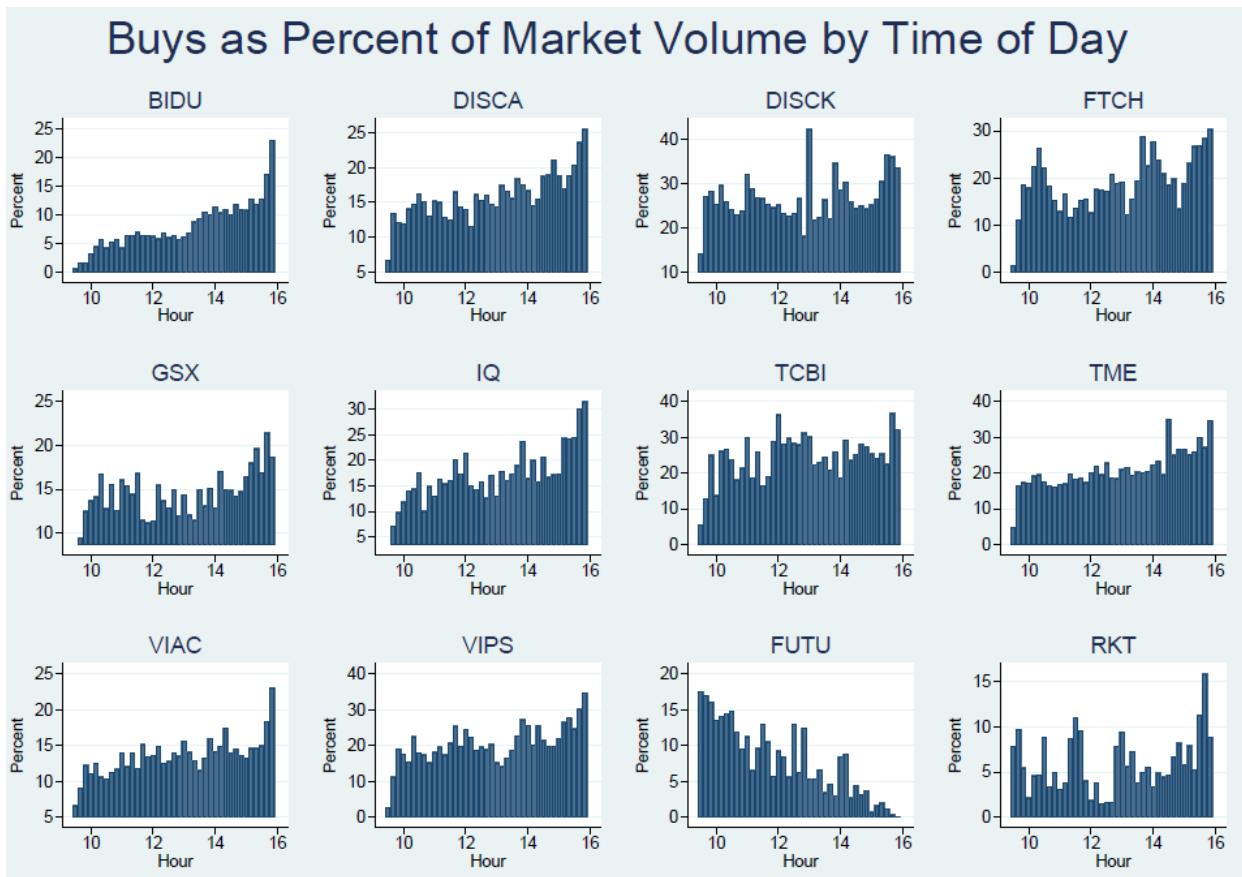


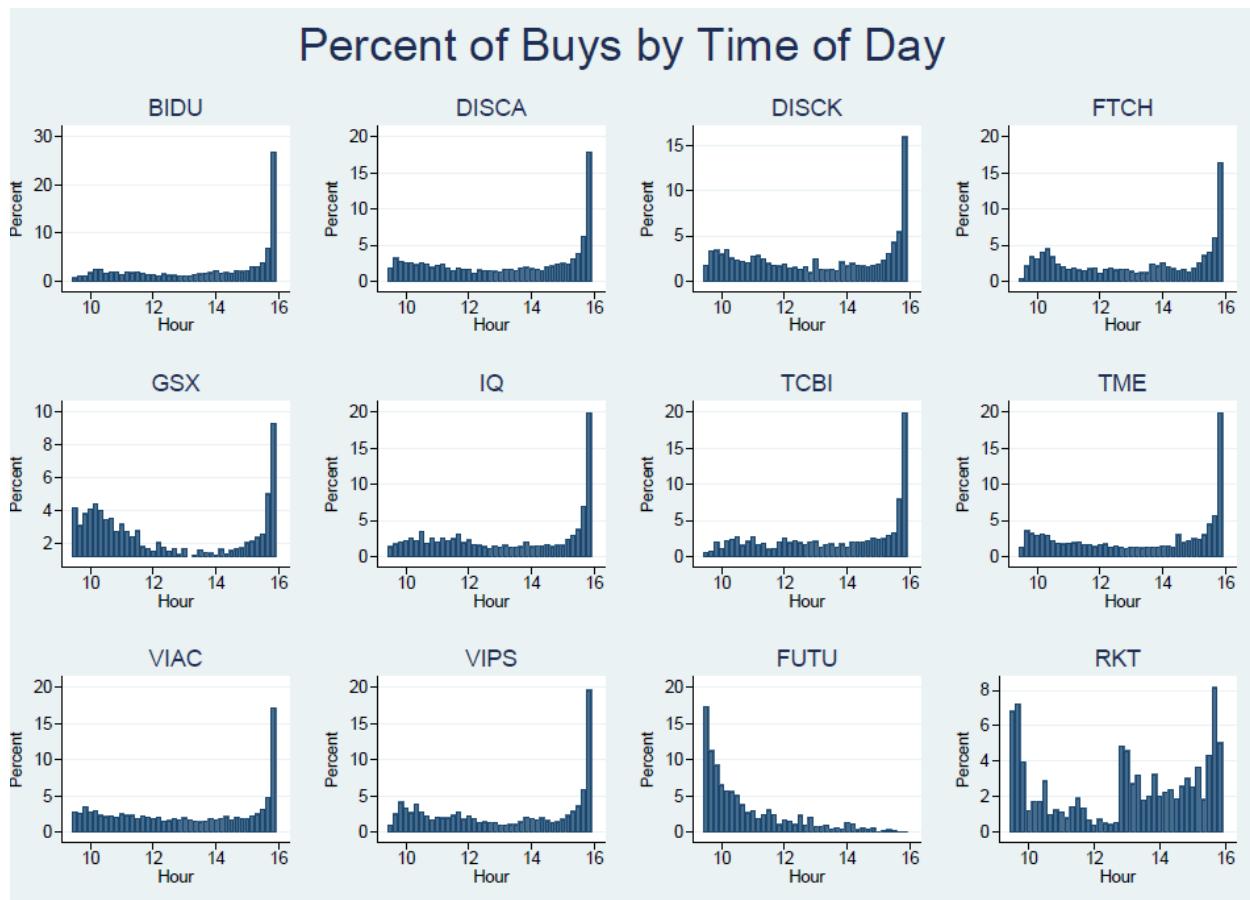
19. Dr. Taveras will show that, with few exceptions, Archegos began engaging in pre-market trading in the Top Archegos Securities in or around January 2021. This analysis relies on Archegos EMSX data obtained from Bloomberg. (See Appendix B at B.10.)

Number of Ticker/Days with Pre-Market Trading in Archegos Top Securities



20. Dr. Taveras will show that Archegos increased its buy volume of its Top Long Archegos Positions in the end-of-day period, and while market volume generally increases during the end-of-day period, Archegos's buy volume increased more than the market. Dr. Taveras will also show that Archegos increased its sell volume in its Top Short Archegos Positions in the end-of-day period, and while market volume generally increases during the end-of-day period, Archegos's sell volume increased more than the market. This analysis relies upon Archegos EMSX data obtained from Bloomberg and Daily TAQ data. The charts reflecting buy volume are included below, while the charts reflecting sale volume are included in Appendix B at B.11.





C. Trade Matching Analysis

1. Overview

21. As described in the Initial Taveras Notice, Dr. Taveras will opine that Archegos's trade orders in the Top Archegos Securities can be linked with equity transactions in the National Market System. Dr. Taveras's opinion rests on her understanding of Archegos's transactions and the National Market System, a review of Archegos EMSX order records, and Dr. Taveras's analysis matching Archegos orders in the Top Archegos Securities to Daily TAQ data.

2. Scope and Sources

22. Dr. Taveras relied upon order information from EMSX and Daily TAQ data, as well as order information in Archegos's trade blotters. Dr. Taveras matched trades from January 6, 2020 through April 21, 2021.

3. Methodology

23. The matching process aims to associate specific values in the EMSX data—including quantity, price, and adjusted timestamp—to equity execution data from Daily TAQ data. Dr. Taveras developed her algorithm using a computer program named Stata.¹¹ For this analysis, the relevant EMSX and Daily TAQ data fields used to identify matches were the following:

- quantity
- price
- adjusted timestamp

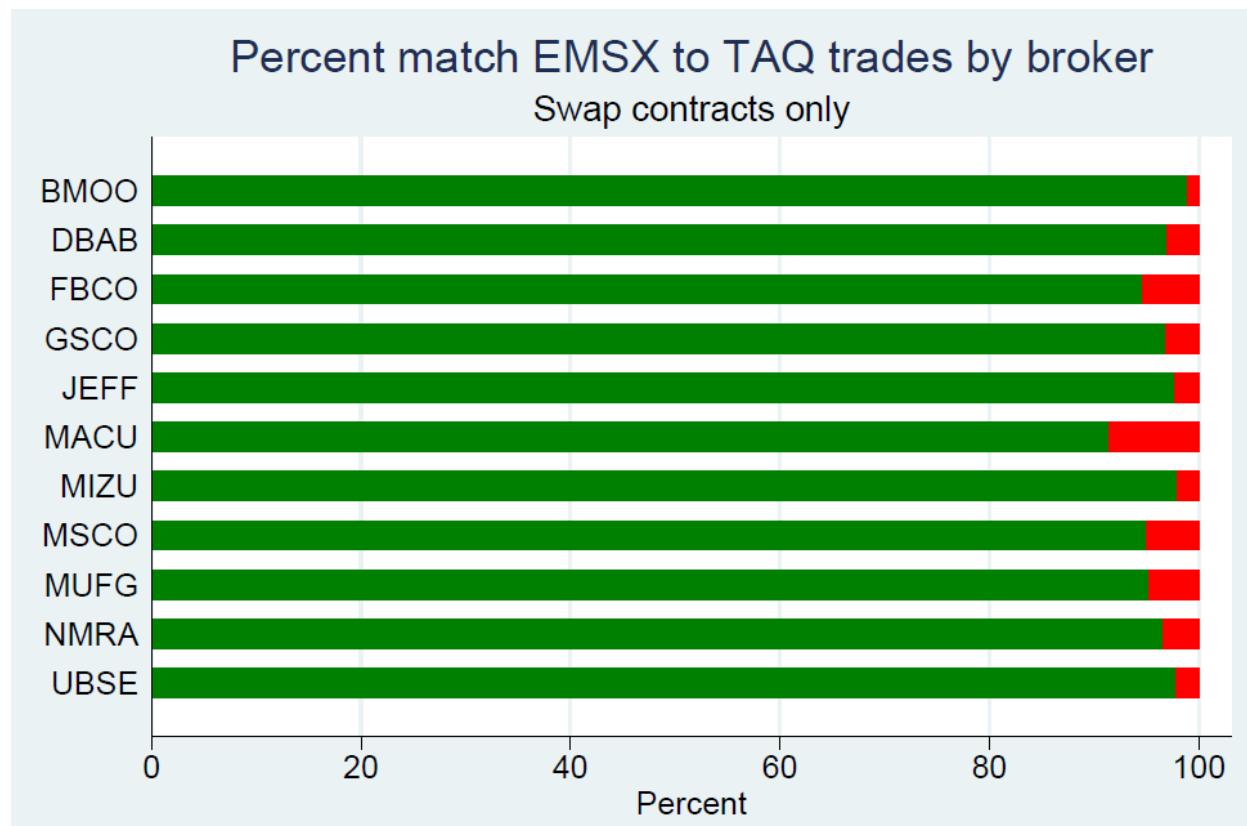
24. The matching process is described as follows: *First*, the relevant Daily TAQ data set was prepared. All trades in the Daily TAQ data marked by TAQ as regular trades, which are denoted with a Trade Correction Indicator of “00”, were included. In addition, all regular trades, extended hour trades, odd lot trades, or intermarket sweep orders, which are marked with a Sale Condition of “@”, “T”, “I”, or “F” were included. All trades with any other Trade Correction Indicator or Sale Condition code in the Daily TAQ data were excluded. *Second*, any precision in the time stamp beyond the second was stripped from the time stamp for both EMSX data and Daily TAQ data. By this, a time stamp of “13:09:44.927074” would become “13:09:44”. *Third*, EMSX trades were matched to the Daily TAQ trades based on an exact match of quantity, price, and adjusted timestamp. *Fourth*, for the remaining trades that did not match initially, one second was added to the EMSX timestamp and a match was made based on an exact match of quantity, price, and the newly adjusted timestamps. *Fifth*, for the remaining trades that did not match, one second was

¹¹ The Government has produced to the defense the various programming codes used to conduct the matching analysis in the Stata program.

subtracted from the EMSX timestamp and a match was made based on an exact match of quantity, price, and the newly adjusted timestamps.

4. *Results*

25. The trades matched from EMSX records to Daily TAQ execution data are provided in Appendix A at A.1.¹² As set forth below, for the entire EMSX dataset, 93.88% of trades were matched based on an exact match of quantity, price, and adjusted timestamp. When one second was added to the EMSX timestamp, an additional 0.89% of trades were matched over the entire dataset. When one second was subtracted from the EMSX timestamp, an additional 1.35% of trades were matched over the entire dataset. In total, the algorithm matches 96.11% of EMSX trades (including both equity and equity swaps transactions) to Daily TAQ trades. A table reflecting the total percentage of matched trades by counterparty for swap equity transactions only is included below and at Appendix C at C.1:



¹² See the file named “splitsmatched.dta.” This file can be opened with the Stata or SAS program.

D. Intraday Price Analysis

1. Overview

26. As described in the Initial Taveras Notice, Dr. Taveras will opine that, with respect to the Top Archegos Securities, as Archegos set limit prices for the Top Archegos Securities in the pre-open market trading and end-of-day trading periods, the prevailing market prices for the Top Archegos Securities quickly followed the limit prices set by Archegos. Dr. Taveras will further opine that this trend occurred during market hours as well. Dr. Taveras will opine that the pattern of a limit price followed by a rise in market price to meet it across multiple observations and multiple tickers is highly unusual, and indicative of market impact. Dr. Taveras's opinion rests on an intraday price analysis study that Dr. Taveras conducted that matches Archegos order data in the EMSX data for the Top Archegos Securities to Daily TAQ data.

2. Scope and Sources

27. Dr. Taveras relied upon order information from EMSX and trade information from Daily TAQ data, as well as order information in Archegos's trade blotters. Dr. Taveras made graphical representations of intraday price movements, on several days, between July 2020 through March 2021. A list of dates for which Dr. Taveras prepared intraday price movement charts is included in Appendix D at D.1.

3. Methodology

28. The intraday price analysis associates changes in Archegos's limit orders with changes in the market prices for the Top Archegos Securities. The analysis occurs with the assistance of two computer programs—SAS and Stata.

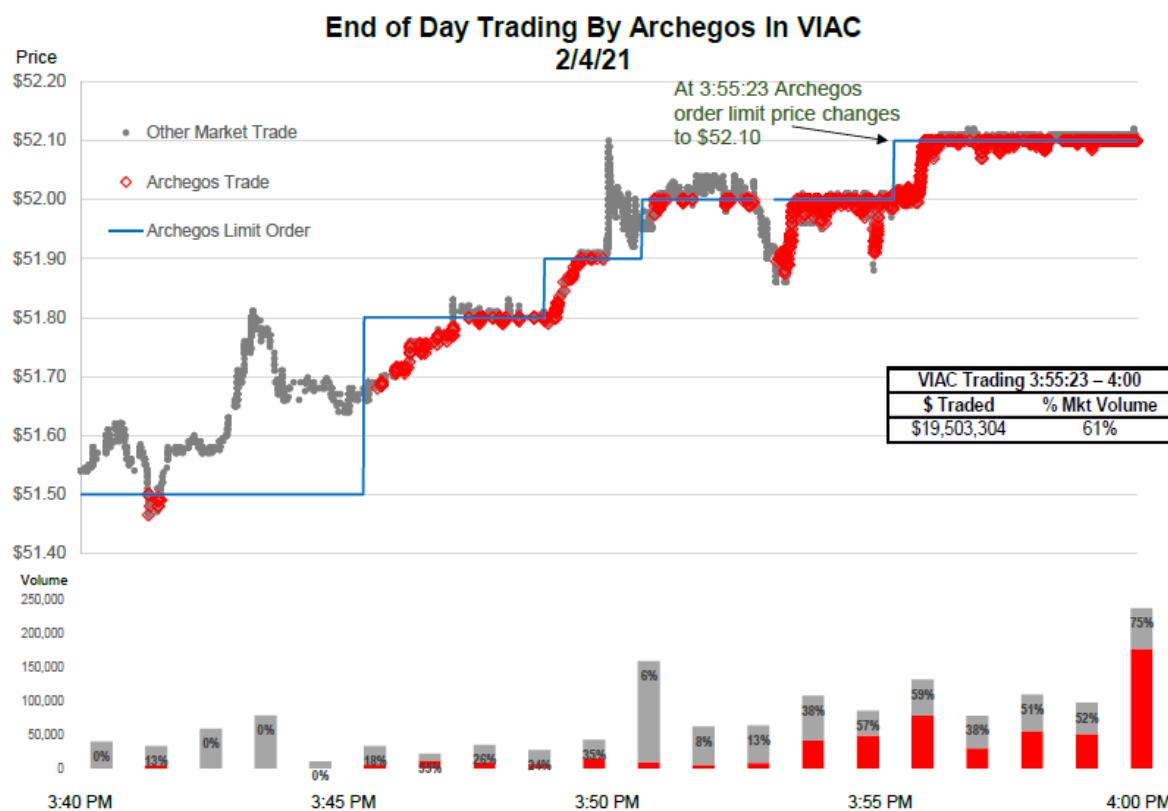
29. The analysis occurs in several steps as described below. *First*, to show the prevailing market prices, the relevant Daily TAQ data set was prepared. All trades in the Daily TAQ data marked by TAQ as regular trades, which are denoted with a Trade Correction Indicator of "00", were included. In addition, all regular trades, extended hour trades, odd lot trades, or intermarket sweep orders, which are marked with a Sale Condition of "@", "T", "I", or "F" were included. All trades with any other Trade Correction Indicator or Sale Condition code in the Daily TAQ data were excluded. *Second*, the relevant Daily TAQ data set was compared to the Archegos's limit prices and executions in the EMSX data. As shown below, the trade prices for the EMSX trades are reflected in red while the rest of the market is shown in gray using TAQ Data. Limit prices of the EMSX data are shown with blue lines.

30. In addition, trade volume for the EMSX trades (in red) was compared to the rest of the market (in gray), summarized by different time intervals. Here, the Daily TAQ trades that were included were identified with a Trade Correction Indicator of "00" or "01", indicating that the trades were not canceled or in error, and exclude the open and closing cross.

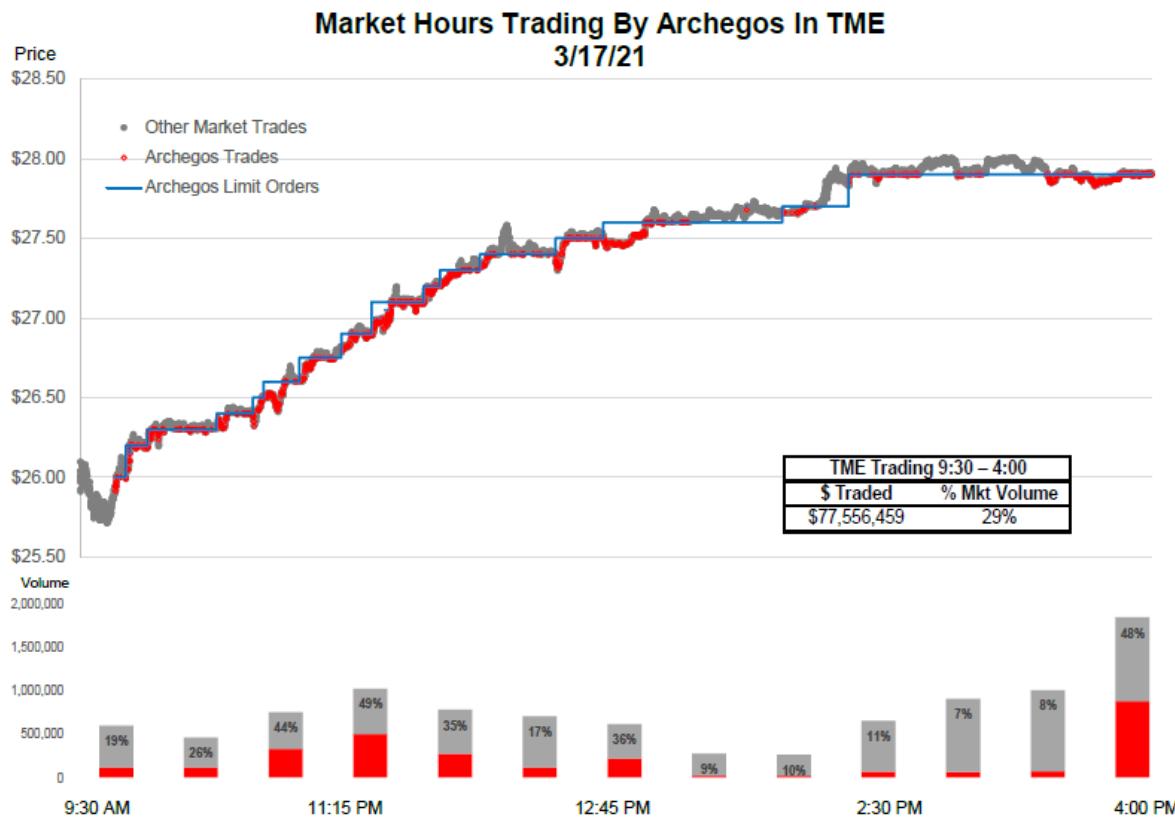
4. Results

31. As reflected below, as Archegos set limit prices for the Top Archegos Securities, the prevailing market prices for the Top Archegos Securities followed the limit prices set by Archegos. This occurred on multiple days, between July 2020 and March 2021, during the pre-open market trading period, during market hours, and during the end-of-day trading period. Dr. Taveras will opine that the pattern of a limit price followed by a rise in market price to meet it across multiple observations and multiple tickers is highly unusual, and indicative of market impact.

32. An example of Dr. Taveras's analysis during the end-of-day period for VIAC is below:



33. An example of Dr. Taveras's analysis during market hours for TME is below:



Additional examples of the intraday price matching for the Top Archegos Securities are included in Appendix D at D.2 (Pre-Market), D.3 (Market Hours), and D.4 (End of Day).

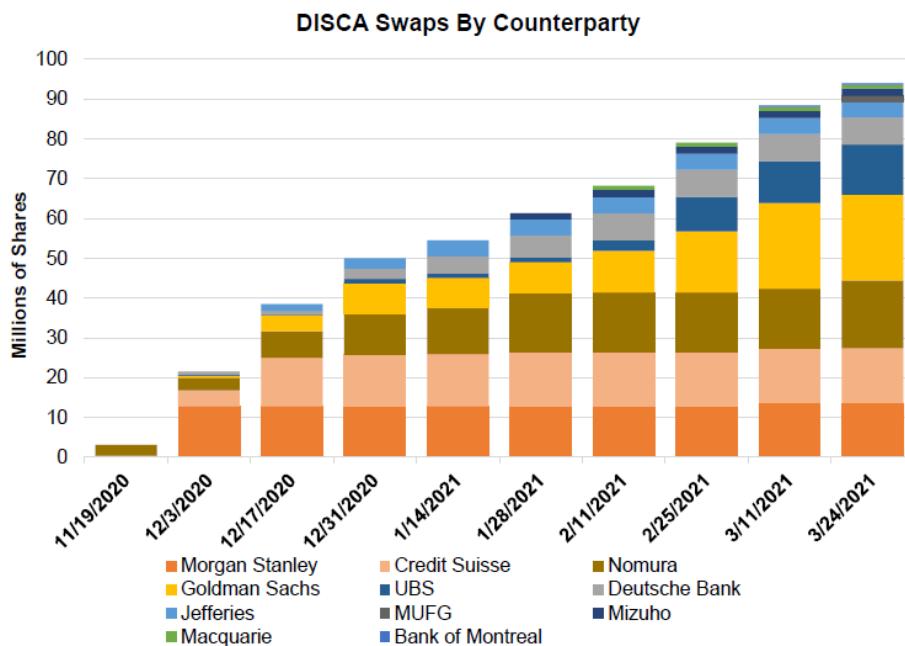
E. Counterparty Analysis

34. As described in the Initial Taveras Disclosure, Dr. Taveras will opine that Archegos generally would build positions in the Top Archegos Securities at a particular counterparty and then pivot to another counterparty to continue building its position in the Top Archegos Securities. Dr. Taveras will opine that this trend continued over time and culminated with Archegos having positions at nearly a dozen counterparties in certain of the Top Archegos Securities. Dr. Taveras will further opine that Archegos's pivoting to different counterparties was often associated with Archegos's capacity at a particular counterparty being "maxed out" or restricted, such that Archegos could not engage in additional swap transactions with respect to a particular security at that counterparty.

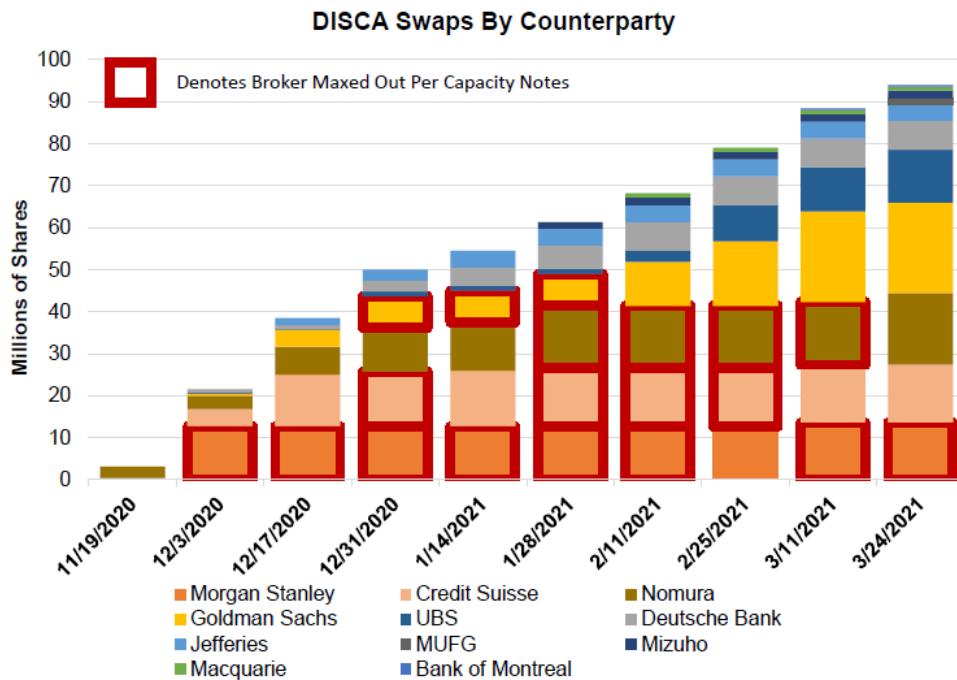
35. This analysis is based on the following:

- Archegos's trade blotters
- Capacity notes emails that were circulated internally at Archegos.¹³

36. An example of Dr. Taveras's counterparty analysis for DISCA is below. Additional charts reflecting the remaining Top Archegos Securities are included in Appendix E as E.1.



¹³ SDNY_P001_0002434591; SDNY_P001_0002491223; SDNY_SWR_0000635327; SDNY_P001_0002496136; SDNY_P001_0002442072; SDNY_P001_0000252395; SDNY_P001_0000252470; SDNY_P001_0000252515; SDNY_P004_0000033584; SDNY_P001_0000252562; SDNY_P001_0000064887; SDNY_P001_0000065121; SDNY_P001_0000078465; SDNY_P001_0000078537; SDNY_P001_0000070982; SDNY_P001_0000071057.



F. Archegos Holdings and Market Price Analysis

37. As described in the Initial Taveras Disclosure, Dr. Taveras will offer several observations and opinions with respect to the relationship between Archegos's holdings in the Archegos Top Long Positions and the market prices for the Archegos Top Long Positions between 2020 and 2021.

38. Dr. Taveras's analysis relies on the following primary data sources:

- Archegos's trade blotters;
- Archegos Combo Sheets;
- CRSP for prices of the Top Archegos Securities;
- Bloomberg for prices of market and industry ETFs;
- Analyst reports and public filings.¹⁴

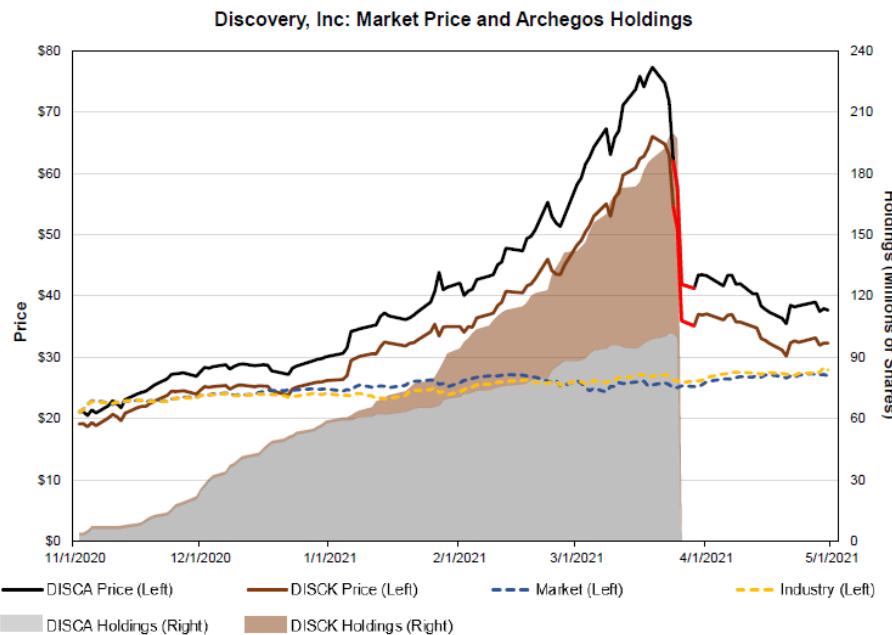
39. Dr. Taveras will show that when Archegos's holdings in the Archegos Top Long Positions increased between 2020 and 2021, the market prices for the Archegos Top Long Positions generally increased. Dr. Taveras will show that beginning in or around November 2020, as Archegos's holdings continued to rise, the performance of the Archegos Top Long Positions

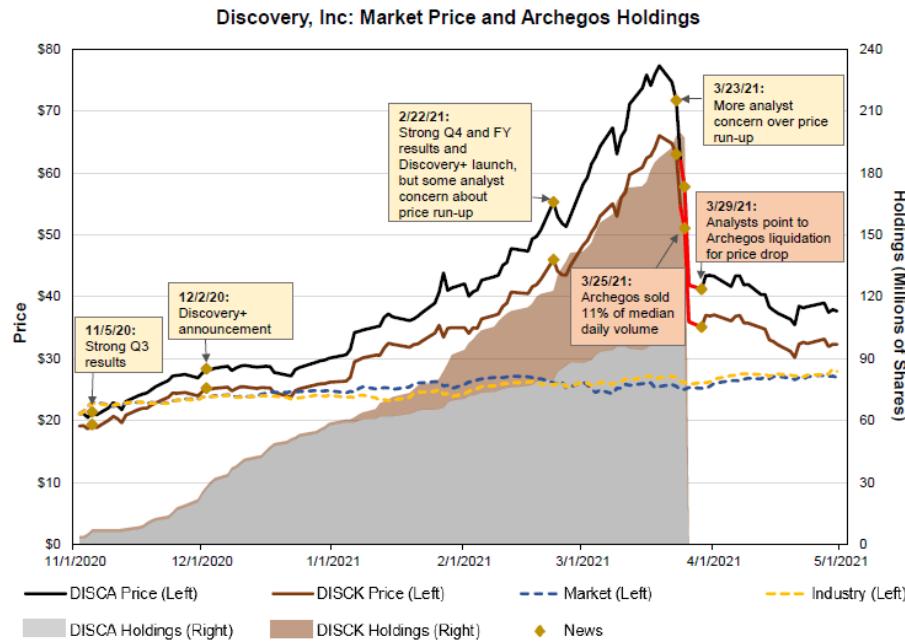
¹⁴ A list of the analyst reports and public filings cited in the charts is included in Appendix F at F.1, which have been provided to the defense.

generally exceeded the relevant market and industry ETFs. Dr. Taveras will further show that the increase in market prices for the Archegos Top Long Positions was often met with caution from market analysts.

40. Dr. Taveras will also show that when Archegos liquidated its positions in late-March 2021 there was an appreciable price drop in the Archegos Top Long Positions. Dr. Taveras will show that, following Archegos's liquidation, market prices for the Archegos Top Long Positions remained depressed and did not recover to their March 2021 levels by at least May 1, 2021. Dr. Taveras will opine that this prolonged depression of market prices for the Archegos Top Long Positions is consistent with the market prices having been inflated during the time period when Archegos was buying the Archegos Top Long Positions.

41. An example of Dr. Taveras's analysis for DISCA and DISCK is below. Additional charts reflecting the remaining Archegos Top Long Positions are included in Appendix F at F.2.



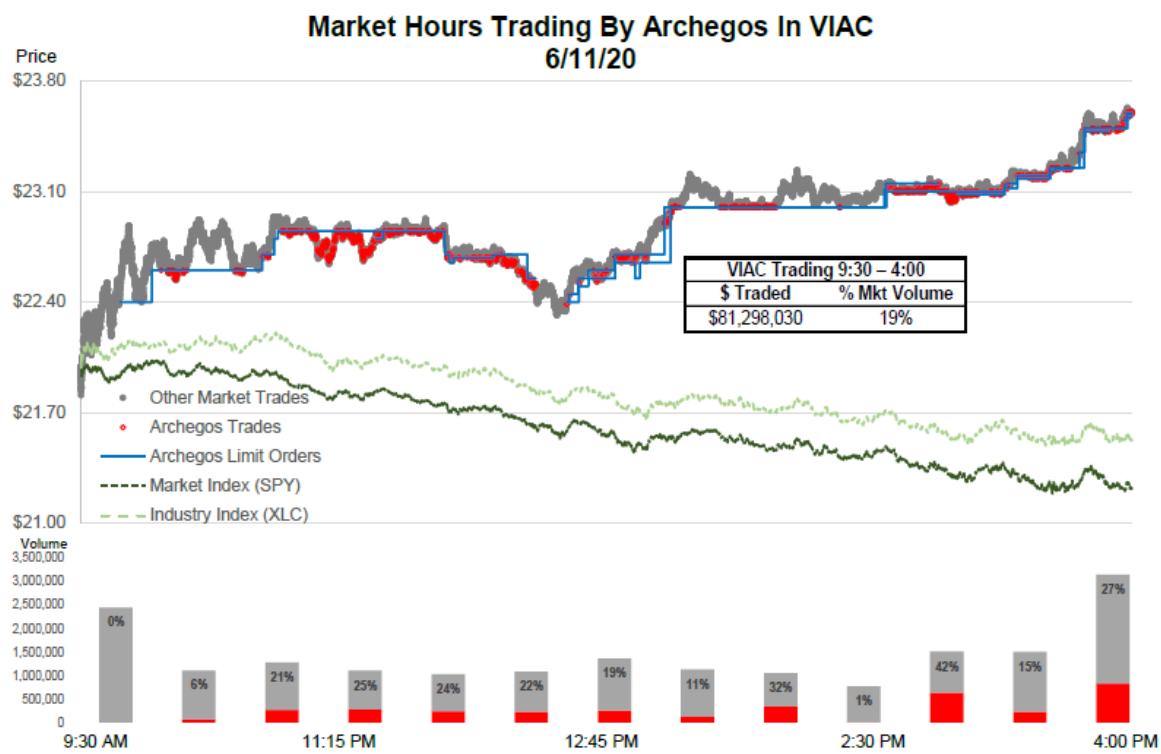


42. Dr. Taveras will also analyze Archegos's trading in VIAC on June 11, 2020, comparing Viacom's intraday price movements with the relevant market and industry ETFs. Dr. Taveras's analysis relies on the following primary data sources, and applies the intraday analysis described in Section D above:

- Archegos EMSX data obtained from Bloomberg;
- Daily TAQ data;¹⁵
- Archegos's trade blotters.

43. As reflected in the chart below, as Viacom traded 19% of the market volume in VIAC on June 11, 2020, the market prices for Viacom increased, while the market and industry ETFs decreased. (See Appendix D at D.3.)

¹⁵ This analysis includes intraday price data for the market and industry ETFs, which is included in Appendix A at A.1



G. Viacom (VIAC) Intraday Analysis

44. As described in the Initial Taveras Disclosure, Dr. Taveras will present a graphical analysis of the movements in VIAC prices and Archegos's trading around the time of the VIAC seasoned equity offering in March 2021.

45. Dr. Taveras's analysis relies on the following primary data sources, and applies the intraday analysis described in Section D above:

- Archegos EMSX data obtained from Bloomberg;
- Daily TAQ data;
- Archegos's trade blotters;
- Press releases for the Viacom seasoned equity offering.¹⁶

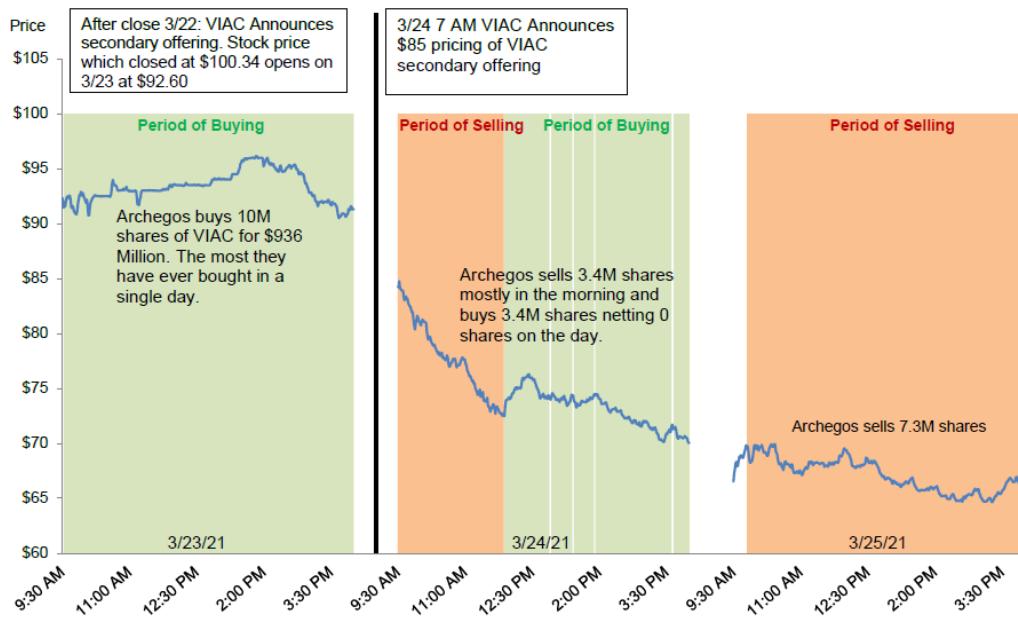
46. As part of this analysis, and drawing upon the academic research and her professional experience, Dr. Taveras will explain that companies may choose to have a seasoned equity offering based on, among other things, a belief that their share price is overvalued. Dr. Taveras will further explain that market prices typically fall following the announcement of a seasoned equity offering.

47. Dr. Taveras will show that, following the VIAC seasoned equity offering that was announced after the market close on March 22, 2021, the market price for VIAC dropped. Then, beginning on the morning of March 23, 2021, Archegos purchased almost \$1 billion worth of VIAC, which was the most Archegos had purchased in a single day, and was consistent with an effort by Archegos to prevent the market price for VIAC from further dropping. Dr. Taveras will show that, on the morning of March 24, 2021, Archegos sold 3.4 million shares of VIAC only to repurchase the same amount of shares later in the day. This is consistent with a trading strategy that aims at keeping the same position size but purchasing at the end of the day, when trades may have a more immediate impact on the closing price. Such a strategy may help to avoid margin calls or allow Archegos to access excess margin from its counterparties if swap positions have gained value at the close of market hours. On March 25, 2021, when the Archegos liquidation began, Archegos sold 7.3 million shares of VIAC, which corresponded to a price drop for VIAC. A visual depiction of this analysis is included below. (See Appendix G at G.1.)

¹⁶ SDNY_P016_0000000930; SDNY_P016_0000000932.

VIAC Intraday Stock Movements

3/23/21 - 3/25/21



H. Approval and Signature

I hereby approve the supplemental disclosure of my qualifications, anticipated opinions, and bases for such opinions, as set forth above.



Carmen Taveras, Ph.D.